

Go to Page 3 for the SOLUTIONS to the practice assignment.

Dilate each point by the given scale factor.

1. $A(3, 2)$, $k = 2$

2. $B(-5, 3)$, $k = \frac{1}{3}$

3. $C(-3, -1)$, $k = \frac{5}{3}$

4. $D(3x, 2y + 1)$, $k = 3$

Find the preimage of each image point below given the scale factor.

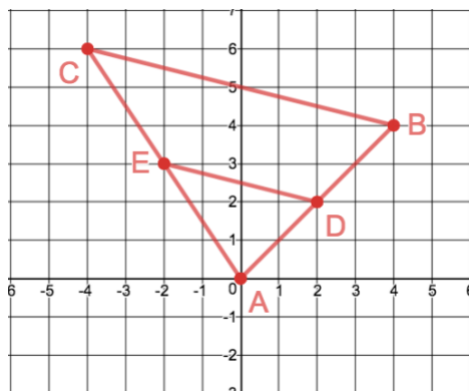
5. $E'(8, -4)$, $k = 4$

6. $F'(7, 2)$, $k = \frac{2}{3}$

7. $G'(-1, 0)$, $k = \frac{6}{5}$

8. $H'(6x - 3, -9y)$, $k = 3$

Use the image below to answer the following questions.



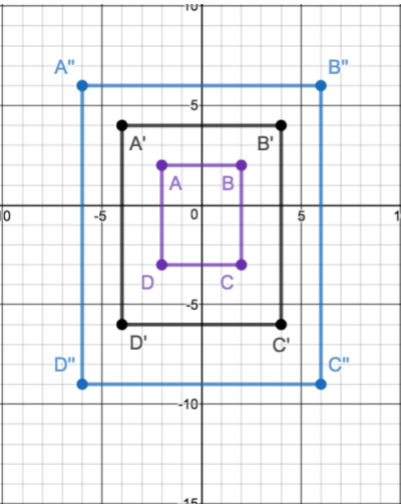
9. Describe the transformation that would map $\triangle ABC$ to $\triangle ADE$. Write a function rule for this transformation.

Given $\triangle ABC$ with $A(3, 2)$, $B(-3, -5)$, and $C(4, -3)$.

10. Perform a dilation centered at the origin given the function rule $f(x, y) \rightarrow (2x, 2y)$. What is the scale factor of this dilation?

11. Connect the corresponding preimage and image points with lines that continue past the points in both directions. What do you notice about the intersection of the lines?

Use the figure to fill in the charts below and answer the questions.



	Points	Sides	Perimeter	Area
ABCD	A() B() C() D()	AB = BC = CD = AD =		
A'B'C'D'	A'() B'() C'() D'()	A'B' = B'C' = C'D' = A'D' =		
Scale Factor				

	Points	Sides	Perimeter	Area
ABCD	A() B() C() D()	AB = BC = CD = AD =		
A''B''C''D''	A''() B''() C''() D''()	A''B'' = B''C'' = C''D'' = A''D'' =		
Scale Factor				

12. What relationship exists between the scale factors?
13. If a triangle with a perimeter of 12 is dilated by a scale factor of 4, what is the perimeter of the image triangle?
14. If a rectangle with an area of 15 is dilated by a scale factor of $\frac{1}{2}$, what is the area of the image rectangle?

Key

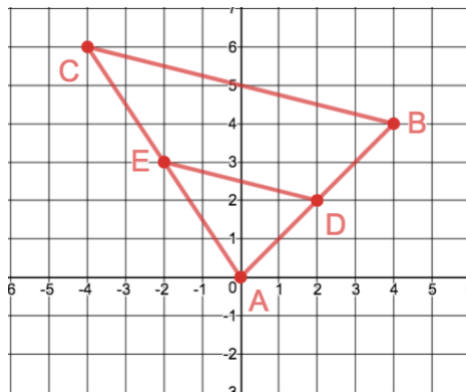
Dilate each point by the given scale factor.

1. $A(3, 2)$, $k = 2$ $A'(6, 4)$ $A(3, 2) \rightarrow A'(3 \cdot 2, 2 \cdot 2) \rightarrow A'(6, 4)$
2. $B(-5, 3)$, $k = \frac{1}{3}$ $B'(-\frac{5}{3}, 1)$ $B(-5, 3) \rightarrow B'(-5 \cdot \frac{1}{3}, 3 \cdot \frac{1}{3}) \rightarrow B'(-\frac{5}{3}, 1)$
3. $C(-3, -1)$, $k = \frac{5}{3}$ $C'(-5, -\frac{5}{3})$ $C(-3, -1) \rightarrow C'(-3 \cdot \frac{5}{3}, -1 \cdot \frac{5}{3}) \rightarrow C'(-5, -\frac{5}{3})$
4. $D(3x, 2y + 1)$, $k = 3$ $D'(9x, 6y + 3)$ $D(3x, 2y + 1) \rightarrow D'(3x \cdot 3, 3(2y + 1)) \rightarrow D'(9x, 6y + 3)$

Find the preimage of each image point below given the scale factor.

5. $E'(8, -4)$, $k = 4$ $E(2, -1)$ $E'(8, -4) \rightarrow E(\frac{8}{4}, \frac{-4}{4}) \rightarrow E(2, -1)$
6. $F'(7, 2)$, $k = \frac{2}{3}$ $F(\frac{21}{2}, 3)$ $F'(7, 2) \rightarrow F(\frac{7}{\frac{2}{3}}, \frac{2}{\frac{2}{3}}) \rightarrow F(7 \cdot \frac{3}{2}, 2 \cdot \frac{3}{2}) \rightarrow F(\frac{21}{2}, 3)$
7. $G'(-1, 0)$, $k = \frac{6}{5}$ $G(-\frac{5}{6}, 0)$ $G'(-1, 0) \rightarrow G(\frac{-1}{\frac{6}{5}}, \frac{0}{\frac{6}{5}}) \rightarrow G(-1 \cdot \frac{5}{6}, 0) \rightarrow G(-\frac{5}{6}, 0)$
8. $H'(6x - 3, -9y)$, $k = 3$ $H(2x - 1, -3y)$ $H'(6x - 3, -9y) \rightarrow H(\frac{6x - 3}{3}, \frac{-9y}{3}) \rightarrow H(2x - 1, -3y)$

Use the image below to answer the following questions.



$$\begin{aligned} A(0,0) &\rightarrow A(0,0) \\ C(-4,6) &\rightarrow E(-2,3) \\ B(4,4) &\rightarrow D(2,2) \end{aligned}$$

9. Describe the transformation that would map $\triangle ABC$ to $\triangle ADE$. Write a function rule for this transformation.

Dilation by a factor of $\frac{1}{2}$. $f(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$

$$(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$$

Each (x, y) pair is divided by 2 or multiplied by $\frac{1}{2}$.

Given $\triangle ABC$ with $A(3, 2)$, $B(-3, -5)$, and $C(4, -3)$.

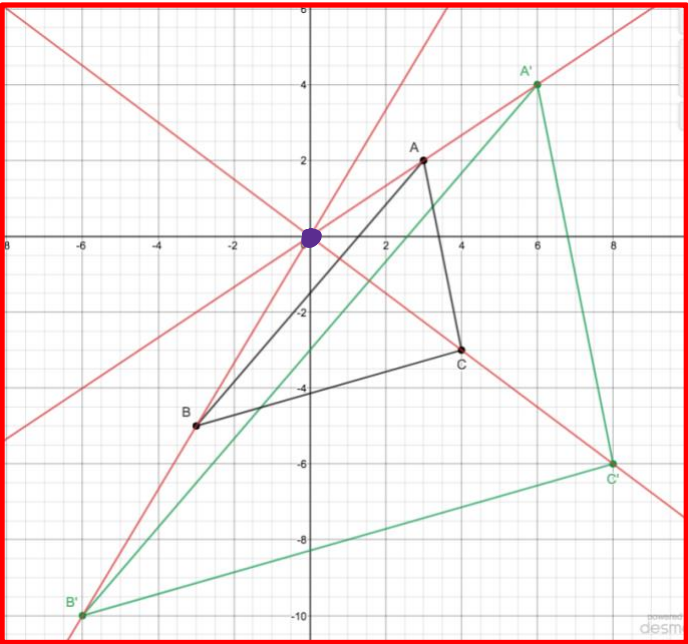
10. Perform a dilation centered at the origin given the function rule $f(x, y) \rightarrow (2x, 2y)$. What is the scale factor of this dilation?

$A'(6, 4)$, $B'(-6, -10)$, and $C'(8, -6)$ Scale factor = 2

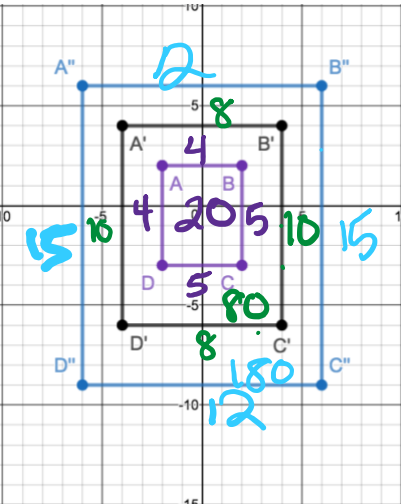
$$\begin{aligned} A(3, 2) &\rightarrow A'(3 \cdot 2, 2 \cdot 2) \rightarrow A'(6, 4) \\ B(-3, -5) &\rightarrow B'(-3 \cdot 2, -5 \cdot 2) \rightarrow B'(-6, -10) \\ C(4, -3) &\rightarrow C'(4 \cdot 2, -3 \cdot 2) \rightarrow C'(8, -6) \end{aligned}$$

11. Connect the corresponding preimage and image points with lines that continue past the points in both directions. What do you notice about the intersection of the lines?

The lines all intersect at the origin which is the center of dilation.



Use the figure to fill in the charts below and answer the questions.



	Points	Sides	Perimeter	Area
ABCD	A(-2, 2)B(2, 2)C(2, -3)D(-2, -3)	AB = 4 BC = 5 CD = 4 AD = 5	18	20
A'B'C'D'	A'(-4,4)B'(4,4)C'(4,-6)D'(-4,-6)	A'B' =8 B'C' =10 C'D' =8 A'D' =10	36	80
Scale Factor	2	2	2	4

each (x,y) pair is multiplied by 2.

~~18~~ ~~20~~

	Points	Sides	Perimeter	Area
ABCD	A(-2, 2)B(2, 2)C(2, -3)D(-2, -3)	AB = 4 BC = 5 CD = 4 AD = 5	18	20
A"B"C"D"	A"(-6, 6)B"(6, 6)C"(6, -9)D"(-6, -9)	A"B"=12 B"C"=15 C"D"=12 A"D"= 15	54	180
Scale Factor	3 each (x,y) pair is multiplied by 3.	3	3	9

12. What relationship exists between the scale factors?

Points, side lengths, and perimeters all have the same scale factor while area scale factor is the square of the point/side length/perimeter scale factor.

$$\text{area} = (\text{scale factor})^2$$

13. If a triangle with a perimeter of 12 is dilated by a scale factor of 4, what is the perimeter of the image triangle?

48

$$12 \times 4 = 48$$

14. If a rectangle with an area of 15 is dilated by a scale factor of $\frac{1}{2}$, what is the area of the image rectangle?

$\frac{15}{4}$

$$\left(\frac{1}{2}\right)^2 = \frac{1}{4} \text{ area scale factor}$$

$$15 \cdot \frac{1}{4} = \frac{15}{4}$$